

**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

**REMARKS**

**As to the References That the Examiner did not Consider**

The Applicant recognizes that the Examiner has not considered certain prior art references due to lack of publication dates for those references. The Applicant is attaching herewith an updated Form PTO SB/08/B including the references at issue, with publication dates for those references. Only the references from the prior submission that have not been considered are included. Applicant apologizes for the omission of the publication dates and respectfully requests the Examiner to now consider those references, which were originally submitted on January 23, 2004. Because a bona fide attempt was made to comply with 37 CFR 1.98 relative to the references at issue, it is believed that no fee is due for the updated submission.

**As to the Claims**

Claims 1-36 remain in the application with claims 1, 15, 28, and 35 in independent form.

Claims 1-36 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,837,069 to Deards et al. (Deards) alone or in view of the English language abstract of Japanese Patent No. 61174333A (the Japanese reference) or "Materials: Science and Engineering" to Keyser, page 164 (Keyser). Various dependent claims also stand rejected under § 103 primarily relying on Deards et al. and other references. The Applicant respectfully traverses these rejections.

Appln. No.: 10/655,237  
Response dated October 12, 2005  
Reply to Office action of July 14, 2005

**Claim Rejections Relying Primarily on Deards:**

The Applicant respectfully traverses this § 103(a) rejection. More specifically, the Applicant respectfully submits that the Examiner has **not** established the requisite *prima facie* case of obviousness.

As the Examiner is aware, to establish a *prima facie* case of obviousness, three basic criteria must be met. See MPEP 2143. The Applicant asserts that the Examiner has failed to satisfy all three of the criteria.

As to the first criterion, i.e., the requirement that there be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, there is no motivation within Deards to austenitize a substantially pearlitic microstructure in an intercritical temperature range of from 1380°F to 1500°F for a period of at least 10 minutes **to produce a ferritic plus austenitic microstructure**, as claimed in independent claims 1, 15, and 28. Even assuming such as motivation can be found merely by relying on the overlapping austenitizing times and temperatures between those claimed in the subject application and those disclosed in Deards, there is surely no motivation within Deards to **austemper the ferritic plus austenitic microstructure** in an austempering temperature range of from 575°F to 750°F for a period of at least 8 minutes **to produce a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite**, as also claimed in independent claims 1, 15, and 28. Independent claim 35 requires the continuous matrix of equiaxed ferrite with islands of austenite.

Deards requires, beginning in column 2, line 58, “maintaining the casting in the temperature range of from 750° to 950° C. for a period which is long enough to ensure

**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

that substantially all of said pearlitic and/or ferritic structure **is converted to an austenitic structure . . .**” The austenitic structure of Deards is **different** from the ferritic plus austenitic microstructure of the subject invention. As repeatedly emphasized in the original specification (see, for example, paragraph [0029]), the ferritic plus austenitic microstructure is the focus because it enables the final microstructure of the continuous matrix of equiaxed ferrite with islands of austenite to be formed. The ferritic plus austenitic microstructure is obtained by austenitizing at an austenitizing temperature within the claimed range of from 1380° to 1500° F, for the claimed austenitizing time of at least 10 minutes.

As the Examiner is aware, the teaching or suggestion to make the asserted modification must be found in the prior art, and the teaching or suggestion to modify reference teachings cannot be based on the Applicant’s own disclosure. Not only is the motivation to produce a ferritic plus austenitic microstructure and/or austemper the ferritic plus austenitic microstructure absent from Deards, but the examiner fails to realize that Deards **explicitly teaches away** from those limitations by requiring that substantially all of the pearlitic and/or ferritic structure be converted to the austenitic structure, which austenitic structure is then quenched to produce the ausferritic microstructure. Simply stated, there is no suggestion or motivation to modify Deards to austenitize a substantially pearlitic microstructure to produce a ferritic plus austenitic microstructure, and/or to austemper the ferritic plus austenitic microstructure.

As to the second criterion, i.e., the requirement that there must be a reasonable expectation of success, Deards makes clear that an ausferritic microstructure is the desired final microstructure produced. Deards further emphasizes that the ausferritic

**Appln. No.: 10/655,237**

**Response dated October 12, 2005**

**Reply to Office action of July 14, 2005**

microstructure is obtained from the fully austenitic microstructure, which is **different** from the ferritic plus austenitic microstructure associated with the subject invention. Specific processing considerations for producing the ausferritic microstructure are discussed in detail in the Background of the Invention section of the subject application, specifically in paragraph [0007]. There is significant discussion in Deards of the advantages of the ausferritic microstructure, to the exclusion of other microstructures. Furthermore, there is no recognition within Deards that other microstructures may be produced within the austenitizing times and temperatures disclosed, and there is no recognition that a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite may be produced by austempering the ferritic plus austenitic microstructure. As such, Deards expressly **teaches away from** the microstructures claimed in the subject application. Thus, as the Examiner has modified Deards, Deards does not satisfy the requirement that there be a reasonable expectation of success that, specifically, austenitizing within the disclosed time and temperature ranges may produce a *ferritic plus austenitic* microstructure, or that the *ferritic plus austenitic* microstructure may be austempered to produce a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite.

As to the third criterion, i.e., the requirement that the prior art reference when modified, or references when combined, must teach or suggest all the claim limitations, Deards alone does disclose, teach, or otherwise suggest austenitizing a substantially pearlitic microstructure in an intercritical temperature range of from 1380°F to 1500°F for a period of at least 10 minutes **to produce a ferritic plus austenitic microstructure**, as claimed in independent claims 1, 15, and 28. Furthermore, Deards does not disclose,

teach, or otherwise suggest **austempering the ferritic plus austenitic microstructure** in an austempering temperature range of from 575°F to 750°F for a period of at least 8 minutes **to produce a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite**, as also claimed in independent claims 1, 15, and 28. Independent claim 35 requires the continuous matrix of equiaxed ferrite with islands of austenite.

In contrast, as set forth above, Deards requires “maintaining the casting in the temperature range of from 750° to 950° C. for a period which is long enough to ensure that substantially all of said pearlitic and/or ferritic structure **is converted to an austenitic structure . . .**” As previously stated, the austenitic structure of Deards is **different** from the ferritic plus austenitic microstructure of the subject invention.

On page 3, paragraph 9 of the Office Action, the Examiner incorrectly suggests that the microstructure of the continuous matrix of equiaxed ferrite with islands of austenite would be expected in view of Deards, since the composition and process of making are essentially the same. As would be recognized by those of skill in the art, stated ranges for austenitizing times and temperatures **do not** ensure that the same microstructure will be obtained after austenitizing. More specifically, although the fully austenitic microstructure may be obtained by austenitizing the pearlitic and/or ferritic microstructure within the temperature range of from 750° to 950° C, depending on the austenitizing time, and the austenitic microstructure may be obtained by austenitizing for a period of from 0.5 to 2.5 hours, depending on austenitizing temperature, austenite **will not necessarily** be obtained with every combination of austenitizing temperature, austenitizing time, and starting microstructure within those

**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

respective ranges. Deards does not teach any other microstructure after austenitizing besides the austenitic microstructure.

Referring to page 3, paragraph 9 of the present Office Action, the Examiner indicates that the comparative testing data from the original specification is invalid since a starting microstructure is ferritic-pearlitic steel rather than pearlitic steel, and thus is not representative of the prior art steel of Deards. To the contrary, the comparative test data is **valid** and representative of Deards. Those of skill in the art appreciate that in the production of the ausferritic microstructure, it is immaterial whether the starting microstructure is pearlitic or ferritic-pearlitic. More specifically, the same **fully austenitic** microstructure is obtained after austenitizing regardless of whether a pearlitic and/or ferritic microstructure is austenitized. The ausferritic microstructure is derived from the fully austenitic microstructure after austempering. It is to be appreciated that, unlike production of a fully austenitic microstructure, to obtain the ferritic plus austenitic microstructure after austenitizing as claimed herein, the substantially pearlitic starting microstructure is important.

As set forth above, Deards does not disclose, teach, or otherwise suggest austempering the ferritic plus austenitic microstructure to produce the microstructure of the continuous matrix of equiaxed ferrite with islands of austenite, as claimed by independent claims 1, 15, and 28. The final microstructure in Deards is an ausferritic microstructure, which is obtained from the fully austenitic microstructure, and not from a ferritic plus austenitic microstructure. The ausferritic microstructure of Deards is different from the microstructure of the continuous matrix of equiaxed ferrite with islands of austenite of the subject invention, which **cannot** be obtained from the fully

**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

austenitic microstructure. As such, although the strict austenitizing times and temperatures, as well as the strict austempering times and temperatures, between Deards and the subject invention may have some commonalities, Deards **does not** disclose austempering the ferritic plus austenitic microstructure and, as a result, the respective microstructures of Deards and the claimed invention are clearly different.

For these reasons, the Applicant asserts that Deards does not disclose, teach, or otherwise suggest all the claim limitations of independent claims 1, 15, 28, and 35.

**Claim Rejections Relying on Deards in View of the Japanese Reference:**

The Applicant respectfully traverses this § 103(a) rejection. More specifically, the Applicant respectfully submits that the Examiner has **not** established the requisite *prima facie* case of obviousness. As above, the Applicant asserts that the Examiner has failed to satisfy all three of the criteria for establishing the *prima facie* case of obviousness.

Like Deards, the Japanese reference discloses austenitizing within a temperature ranges and for a time period that overlaps with the claimed ranges in the subject application. Furthermore, the Japanese reference discloses austempering within the same time and temperature ranges as Deards to obtain a bainite-austenite microstructure, i.e., an ausferritic microstructure, which is the same as the resulting microstructure of Deards. As with Deards, the resulting microstructure is **not** a microstructure of the continuous matrix of equiaxed ferrite with islands of austenite.

The Japanese reference adds nothing to the disclosure or teachings of Deards. Thus, when combined, Deards and the Japanese reference do not disclose, teach, or

**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

otherwise suggest austenitizing a substantially pearlitic microstructure in an intercritical temperature range of from 1380°F to 1500°F for a period of at least 10 minutes **to produce a ferritic plus austenitic microstructure**. Furthermore, when combined, Deards and the Japanese reference do not disclose, teach, or otherwise suggest **austempering the ferritic plus austenitic microstructure** in an austempering temperature range of from 575°F to 750°F for a period of at least 8 minutes **to produce a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite**.

**Claim Rejections Relying on Deards in View of Keyser:**

The Applicant respectfully traverses this § 103(a) rejection. More specifically, the Applicant respectfully submits that the Examiner has **not** established the requisite *prima facie* case of obviousness. As above, the Applicant asserts that the Examiner has failed to satisfy all three criteria for establishing the *prima facie* case of obviousness.

Although Keyser suggests various microstructures of iron that can be obtained at different temperatures when various amounts of carbon are present in the iron, Keyser does not disclose, teach, or suggest austenitizing a substantially pearlitic microstructure within the claimed ranges of austenitizing time and temperature to obtain a ferritic plus austenitic microstructure. Furthermore, Kaiser does not disclose, teach, or suggest a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite.

Thus, when combined, Deards and Keyser do not disclose, teach, or otherwise suggest austenitizing a substantially pearlitic microstructure in an intercritical temperature range of from 1380°F to 1500°F for a period of at least 10 minutes **to**



**Appln. No.: 10/655,237**  
**Response dated October 12, 2005**  
**Reply to Office action of July 14, 2005**

**produce a ferritic plus austenitic microstructure.** Furthermore, when combined, Deards and Keyser do not disclose, teach, or otherwise suggest **austempering the ferritic plus austenitic microstructure** in an austempering temperature range of from 575°F to 750°F for a period of at least 8 minutes **to produce a microstructure of a continuous matrix of equiaxed ferrite with islands of austenite.**

In view of the remarks set forth above, it is respectfully submitted that the § 103(a) rejections of independent claims 1, 15, 28, and 35 are overcome. As such, these claims are allowable and the remaining claims, specifically the dependent claims, depend either directly or indirectly from the independent claims such that these claims are also allowable.


It is respectfully submitted that the application is now presented in condition for allowance, which allowance is respectfully solicited. Favorable reconsideration of the outstanding office action is hereby requested.

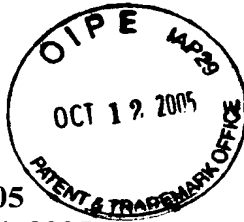
The Commissioner is authorized to charge our deposit account no. 08-2789 for any additional fees or credit the account for any overpayment.

Respectfully submitted,

**HOWARD & HOWARD ATTORNEYS, P.C.**

October 12, 2005  
Date

  
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Appln. No.: 10/655,237

Response dated October 12, 2005

Reply to Office action of July 14, 2005

**CERTIFICATE OF EXPRESS MAILING**

I hereby certify that the enclosed **RESPONSE** and **INFORMATION DISCLOSURE STATEMENT (Form PTO/SB/08B)** and 6 Cited References are being deposited with the United States Postal Service as Express Mail, postage prepaid, in an envelope as "Express Mail Post Office to Addressee", Mailing Label No. **EV564944845US** and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 **MAIL STOP: AMENDMENT** on **October 12, 2005**.

Anne L. Kubit

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